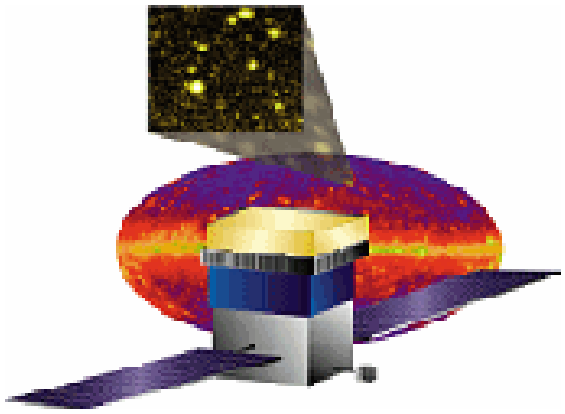
# Monthly Progress Report

**(Month Ending April 2004)**

## GLAST Large Area Telescope (LAT)



LAT-MR-03927-01

June 11, 2004

# 1.0 Introduction

This monthly progress report is submitted to the GLAST Project Office at the Goddard Space Flight Center and the Department of Energy SLAC Site Office. The report summarizes LAT project status as of the end of April, 2004.

# 2.0 Recent Progress and Status

4.1.4 Tracker

The first flight trays were completed up through the enhanced speckle-pattern interferometry (ESPI) test on the bare panel. Multichip module (MCM) production progressed, with nine flight units completed. Several hiccups in the MCM production process were intensively studied and resolved. More qualification testing on MCMs was done, including an inspection at GSFC that found no issues. Bottom tray corner brackets, closeouts, and flexures were delivered (flight parts). Engineering evaluation interface hardware (cones, studs, etc) also arrived and testing commenced. The first lot of flight bias circuits was delivered to Italy. Procurement of prepreg for sidewalls is in progress. A SLAC team spent a week in Italy helping to set up and try out the static test fixture, and procurement began for a new base to interface to the new bottom tray design. Remaining drawings for the bottom and top trays and the sidewalls were completed and reviewed. Design work also progressed on several mechanical ground support equipment pieces, such as a new vibration fixture to support the new Grid interface. Flex-circuit cable drawings were completed and are under engineering review. New improved fixtures and draft procedures for integration of MCMs onto trays were completed and are now under test. Procedure documentation for all of the assembly processes in Italy up through stacked-tray testing and sidewall fabrication were drafted and reviewed by a SLAC/INFN team at Pisa. The database and production traveler system at INFN was also expanded to include all of those procedures and was included in the review. An improved concept for attaching alignment tooling balls and/or retroreflectors to the top tray was devised. Tracker alignment plans were drafted at SLAC and then reviewed with INFN collaborators in Pisa.

4.1.5 Calorimeter

Over 1,050 fully-tested CsI crystals have been delivered to NRL; the light taper on approximately 150 of these did not meet specifications and was corrected. Over 3,000 (out of 4,800) flight PIN photodiode assemblies have been manufactured and tested. Over 650 crystal detector elements (CDEs) have been bonded. Of these, 540 have been wrapped and capped, and 380 have been delivered to NRL. Completion of the CDEs has been limited by availability of end caps, but production is on schedule. Six flight composite structures have been manufactured; five of these have successfully completed strength verification vibration test. All machined parts for structure assembly have been received, with the exception of the titanium stand-off for the Tower Electronics Module (TEM) & TEM power supply. Three mechanical structures have been assembled. Post-burn-in ASIC testing was conducted and no issues found. The flight analog front-end electronics (AFEE) PC boards are being manufactured; the board assembly contract has been placed. Sixteen copies of the AFEE-TEM cable were received; interface tests have

resulted in modifications to the design. The Pre-Electronics Module (PEM) for the first flight module has been completely assembled, and the second is underway. Checkout electronics are being assembled for the first muon calibration. Improved humidity control in the Calorimeter integration & test clean room is now operational.

4.1.6 Anticoincidence Detector

Eighty tile detector assemblies have been received; 62 have been tested and meet performance requirements. The ribbon detector prototypes have been fabricated; final fight tooling is being finalized. All front-end electronics (FREE) boards are in flight assembly. Four have been received; the first FREE board has successfully completed testing. Four high-voltage bias supplies (HVBSs) have been received; the first two have been successfully tested. Phototube assembly is about to commence; tests of new mechanical mounting have been successful. A pre-test review was held for the mechanical structure. The structure is being prepared for testing. Work on the mechanical ground support equipment is nearing completion.

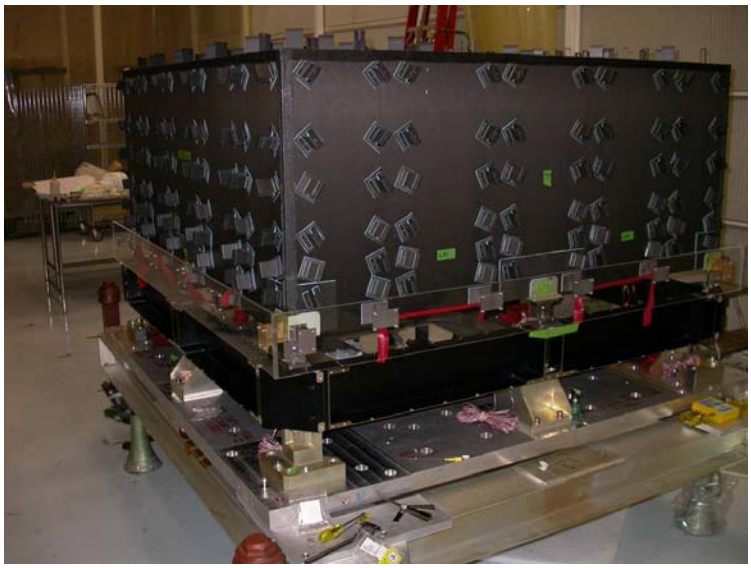


Figure 1: ACD Mechanical Structure on Handling Dolly

4.1.7 Electronics, Data Acquisition, and Flight Software

Updated power distribution unit (PDU) boards were fabricated; two were loaded and are being tested. The GASU schematic was updated, laid out, and four boards fabricated and loaded (one debugged). Two of these boards were assembled into the GASU enclosure and are being tested. ASIC burn-in boards for screening were fabricated and are being tested. Two additional cPCI crates were received, for use in the test bed. Additional LAT communications boards (LCB) and storage interface boards were fabricated, for use in the test bed. The crate power supply module was debugged and tested with the backplane and LCB. Forty-five front-end simulator boards were fabricated, loaded, tested, mounted on the test bed, and connected with installed Tower Electronics Modules (TEMs). Electronics ground support equipment test stands were shipped to Tracker and Calorimeter. The G3 test stand was shipped to ACD; the primary and redundant GASU was successfully connected to the base electronics assembly. A problem was discovered when connected simultaneously, which is under investigation.

Version 1.1.0 of the primary boot code (PBC) was released, including an increased initial CPU clock speed, and loaded into the RAD750 startup ROM. The RAD750 application reboot library was implemented. The VxWorks package has been updated to RAD750 targets to communicate with the PBC at both startup and warm reboots. The secondary boot code run at the end of the real-time operating system initialization has been completed. Housekeeping software is being tested on the test bed; it is able to read out values from the PDU. The latest flight software release has been included in the new release of the LAT Test Executive (LATTE). It was demonstrated that multiple TEMs can be powered on via the power distribution unit. An application is being developed to monitor the "health" of the test bed. An MSG code review was conducted and a second review scheduled.

4.1.8 Mechanical Systems

Eighty percent of final machining operations has been completed on the first grid. Rough machining and head treatment of the second grid are finished. The revised cost and schedule proposal from Lockheed Martin has been approved, and the Phase 2 contract updated. The variable conductance heat pipe qualification burst test was conducted. Planning has commenced for radiation thermal vacuum testing.

Figure 2: Machining of First Grid

4.1.9 Integration & Test (I&T)

Version 3.1.0 of the LAT Test Executive was released. Basic training for the cable integration sequence was conducted, using the I&T training mockup. The metrology bay was received. Drive components for the LAT support stand were ordered. The Van de Graaff simulator was repaired, and now operates at engineering model rates.

Figure 3: Precision Metrology Bay

## 3.0 Schedule Status

There are two equal critical paths for the project, driven by the Tracker MCM production and the assembly of Tracker trays. There is three weeks' variance to the baseline float of five weeks to the "ready for CD-4 review" milestone. This is an improvement of one week over last month's status, and reflects the implementation of a workaround plan. Additional workarounds to mitigate this delay are being assessed.

The status of significant milestones is summarized in Attachments 1 and 2. Attachment 1 presents the status of the Level 1 and Level 2 milestones. Attachment 2 shows the status of the Level 3 milestones planned to occur during the six months preceding and following the current month. Unfavorable variance projections greater than one week to the future milestones are discussed below.

The delivery of the full Tracker EM (milestone 1M1001430) has been delayed by the issues discovered with the interface during the EM vibration test. A workaround plan is underway, enabling integration planning to continue by supplying other hardware and drawings in the interim. Thermal vacuum testing was completed in March; vibration testing will be repeated in June, using a new bottom tray and grid interface.

Variances to the following milestones are due to delays in the MCM and tray assembly processes, as well as the above-mentioned Tracker/grid interface redesign issues. This is critical path for the project, and workarounds are being assessed.

- Tracker Modules A through 5 RFI (1M1000200, 1M1000201, 1M1000220, 1M1000221, 1M1000250, 1M1000251, 1M1000260)

Variances to the following milestones are due to delayed receipt of Calorimeter ASICs and other flight EEE parts. Much of the schedule will be recovered by using parts before completion of screening and qualification. However, continuing problems with the delivery of tantalum capacitors are impacting the schedule. A sufficient number of alternate capacitors have been found to proceed with the first Calorimeter module electronic cards.

- Calorimeter Modules A through 8 RFI (1M1000210, 1M1500, 1M1000230, 1M1510, 1M1000400, 1M1520, 1M1000390, 1M1530, 1M1000380, and 1M1540)
- EM2 TEM/PS for FM9 through FM16 (return FMA through FM6) from I&T to Calorimeter (1M1001790 through 1M1001860)

There are several factors slowing the development of the ACD Test Scripts (1M1001000). The G3 test stands have been delayed, the underlying LAT Test Executive software continues to evolve, and the translation of scientific requirements into test scripts has been more complex than planned.

Variances to the following milestones are due to delays in drawing release driving procurement placement. The drawing release process has been improved, and additional staff has been hired.

- Flight TEM Power Supply Assemblies to I&T (1M79002010 through 1M79002180)
- Flight TEM Assemblies A through 13 to I&T (1M79001010 through 1M79001150)
- Flight Cable Assemblies to I&T (1M79003010 through 1M79003180)

Variances to the following electronics ground support equipment (EGSE) milestones are due to delayed receipt and quality problems with connectors. Effort has been diverted to the installation of Tower Electronics Modules (TEMs) on the Test Bed.

- Updated EGSE Systems (#3-10) to Tracker (1M74000030 through 1M740000100)
- EGSE TEM/TEM PS/CTS w/ FE Electronics #1-3 to I&T (1M7941130, 1M7941150, and 1M7941160)
- G3 Test Stand to ACD (1M76000030)
- Test Stations (5) for AFEE to Calorimeter (1M1001900)
- EGSE TEM/TEM PS/CTS/GASU FE Electronics to I&T (1M7941170)
- EGSE Development H/W/FSW 1$^{st}$ Delivery to I&T (1M7941180)

- EGSE TEM/TEM PS/CTS #1-2 for Bldg. 33 to I&T (1M7941190 and 1M7941420)
- EGSE TEM/TEM PS/CTS w/ GASU for Bldg. 33 to I&T (1M7941430)
- 5 EM2 TEM/PS for AFEE board assy & test: Elec to Cal (1M1001870)

Variances to the following milestones are due to a delay in completion of the Tracker/Calorimeter tower electronics module (TEM) ASIC qualification and screening plan. This is not considered critical path at this time.

- EM2 TEM/PS/CTS for Flight Models A-8 to Calorimeter (1M1001220, 1M1001600, 1M1001660, 1M1001680, 1M1001720, 1M1001760, 1M1001770, 1M1001780)

Fabrication of the following items has been delayed in order to conduct additional system and unit tests, and complete drawing review:

- Flight SIU (1M7941080)
- Flight PDU Box (1M7942000)
- Flight Harness (1M7941110)
- Flight GASU Box (1M7941070)
- Flight Event Processor Units (1M7941090)

The flight grid (1M1000240) has been delayed due to the modifications made to the Tracker/grid interface, adding several weeks' to the manufacturing effort. The schedule savings from adding a second shift to the grid machining have not compensated for the complexity of the machining operations. The manufacturing sequence is currently being evaluated (e.g. shifting work from the vendor to SLAC, examining options for grid plating).

The cross-LAT (X-LAT) thermal plate (1M941710) has been delayed due to issues with the electronics box to X-LAT plate interface, the ground cooling design implementation, and heat pipe bending. These have all been resolved and the Source Control Drawing was released to the vendor.This delay is not expected to impact the LAT schedule.

The ISOC CDR date (1M005480) was delayed from March to August. This was a recommendation of the ISOC Peer Review held in March, and aligns the review date with the documentation availability. This has been coordinated with the GLAST project office at Goddard to minimize the impact on LAT ground system readiness.

## 4.0 Financial Status

Attachment 3 depicts the costs, commitments, and performance through the end of the current reporting period.

Attachments 4 and 5 summarize the actual costs through the current period, by WBS level 3 and institution, respectively. The hours worked/FTE lines include only DOE/NASA-funded labor.

## 5.0 Performance Status (Comparison to Project Baseline)

Attachment 6 is a Cost Performance Report (CPR) for the end of the current reporting period, by WBS level 3. The CPR shows the time-phased budget to date (BCWS), the earned value (BCWP), and the actual costs through the end of the month (ACWP). Attachment 7 shows the same information for each participating DOE- and/or NASA-funded institution. The schedule variance is equal to the difference between the budget-to-date and the earned value and represents a measure of the ahead (positive) or behind (negative) schedule position. The cost variance is equal to the difference between the earned value and the actual costs.

Attachment 8 shows performance analysis (by WBS level 3), including trends in the schedule and cost variances from the previous period. Cumulative cost variances exceeding 10% of the BCWP and cumulative schedule variances exceeding 10% of BCWS (favorable and unfavorable) are discussed below.

4.1.A Performance & Safety Assurance
The favorable cost variance is due to delayed subcontractor invoice payments, and is not a concern at this time.

4.1.C Education & Public Outreach
The favorable cost variance is due to delayed subcontractor invoice payments, and is not a concern at this time.

## 6.0 Change Control and Contingency Analysis

A summary of change requests approved during this period (Level 3 and above), including the impacts on LAT fabrication phase contingencies, is below.

| Change Request No. | Description | Submitted By | Current Status | Contingency Impact |
|---|---|---|---|---|
| LAT-XR-03071-01 | Tracker MCMs & Source Inspection | J. Martin | Approved | $348K |
| LAT-XR-03305-01 | ACD-LAT ICD Update | R. Bielawski | Approved | N/A |
| LAT-XR-03430-01 | Lockheed Martin Phase 2 Budget | M. Campell | Approved | $656K |

The fabrication phase cost baseline is $125.1M. Funding applicable to that baseline is $136.6M; the resulting contingency is $11.4M.

## 7.0 Staffing

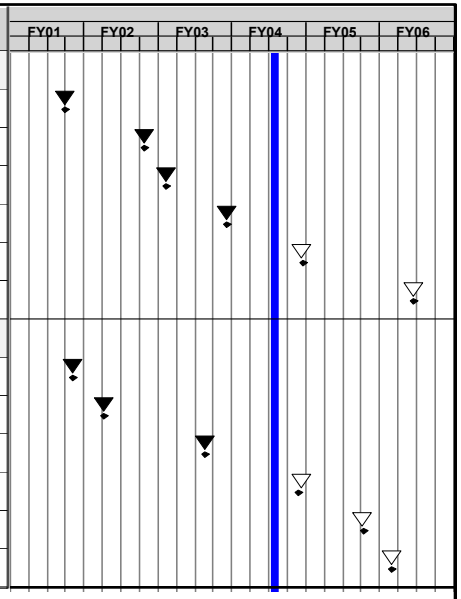
Attachments 9-10 demonstrate the staffing plan, and reports of actual manpower received. Note from Attachment 10 that not all participating organizations are providing manpower data.

The monthly planned FTEs reflect adjustments made so that the cumulative-to-date manpower plan corresponds to the approved changes in that month.

Goddard manpower was not reported in the months of October, November, and December. The January and February incremental FTE report includes the actual manpower for those months, so that the cumulative-to-date actual manpower is correct.

# Attachment 1
# Milestones, Levels 1-2

| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **DOE/NASA Joint Oversight Group (Level 1** | | | | |
| 1M1P000000 | DOE Critical Decision (CD) 0 Approval | 06/25/01A | 0 | 06/25/01A |
| 1M1P000010 | CD-1 Approval | 07/23/02A | 0 | 07/23/02A |
| 1M1P000020 | CD-2 Approval | 11/08/02A | 0 | 11/08/02A |
| 1M1P000030 | CD-3 Approval | 09/03/03A | 0 | 09/03/03A |
| 1M1P000060 | Flight GRID Complete | 09/15/04* | 4 | 09/09/04 |
| 1M1P000040 | CD-4 Approval | 03/15/06* | 0 | 03/15/06* |
| **DOE/NASA Federal Project Managers (Level 2** | | | | |
| 1M1BF00000 | Launch Balloon Flight | 08/01/01A | 0 | 08/01/01A |
| 1M1000100 | Instrument Preliminary Design Review | 01/08/02A | 0 | 01/08/02A |
| 1M1000110 | I-CDR (Critical Design Review) | 05/16/03A | 0 | 05/16/03A |
| 1M1000740 | Start LAT Integration | 08/24/04* | -11 | 09/09/04 |
| 1M1000700 | Pre Environmental Testing Review | 07/14/05* | 8 | 07/01/05 |
| 1M1000120 | PSR-(Instrument Pre-Ship Review) | 12/01/05* | 0 | 12/01/05* |

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**GLAST LAT PROJECT**
**Project Milestones (Level 1 and 2)**

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LT_MS1-2

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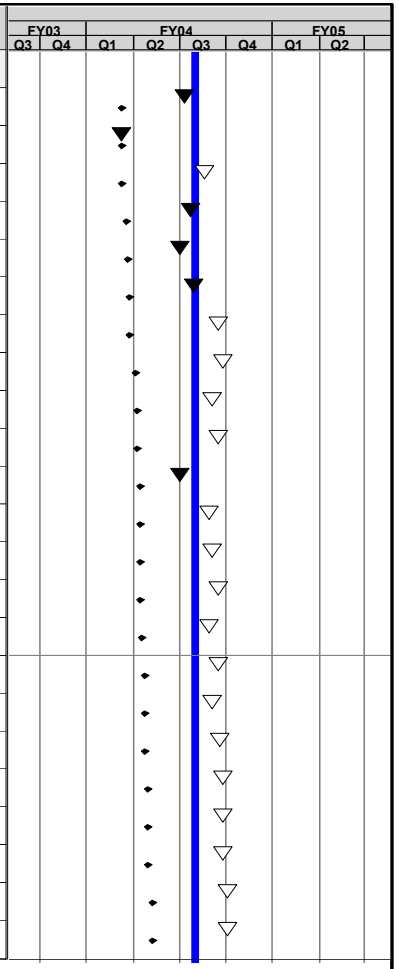
# Attachment 2
# Level 3 Milestones (One-Year View)
# Page 1 of 6

| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **Instrument Project Office (Level 3** | | | | |
| 1M74000010 | Updated EGSE System 1: Elec to TKR | 12/08/03 | -80 | 04/09/04A |
| 1M76000010 | 3rd G2 Test Stand: Elec to ACD | 12/08/03 | 0 | 12/08/03A |
| 1M7941130 | EGSE TEM/TEM PS/CTS w/ FE Elec #1-Elec to I&T | 12/08/03 | -109 | 05/20/04 |
| 1M76000020 | G3 Test Stand (test 2 FREE Cards): Elec to ACD | 12/15/03 | -84 | 04/22/04A |
| 1M1001380 | Delivery of EM (1X4) Grid to I&T/MSGE | 12/19/03 | -64 | 03/31/04A |
| 1M74000020 | Updated EGSE System 2: Elec to TKR | 12/22/03 | -82 | 04/27/04A |
| 1M7941150 | EGSE TEM/TEM PS/CTS w/ FE Elec #2-Elec to I&T | 12/22/03 | -116 | 06/15/04 |
| 1M1001430 | Delv of TKR EM to SLAC I&T/MGSE | 01/02/04 | -122 | 06/25/04 |
| 1M74000030 | Updated EGSE System 3: Elec to TKR | 01/07/04 | -104 | 06/04/04 |
| 1M7941160 | EGSE TEM/TEM PS/CTS w/ FE Elec #3-Elec to I&T | 01/07/04 | -111 | 06/15/04 |
| 1M1000920 | EM2 TEM: Elec to Tracker | 01/12/04 | -55 | 03/31/04A |
| 1M1001900 | Test Stations (5) for AFEE: Elec to CAL | 01/14/04 | -94 | 05/27/04 |
| 1M74000040 | EGSE System 4: Elec to TKR | 01/14/04 | -99 | 06/04/04 |
| 1M7941170 | EGSE TEM/TEM PS/CTS/GASU FE Elec-Elec to I&T | 01/14/04 | -106 | 06/15/04 |
| 1M1001870 | 5 EM2 TEM/PS for AFEE brd ass & tst: Elec to CAL | 01/15/04 | -94 | 05/28/04 |
| 1M1001220 | EM2 TEM/PS/CTS for FMA from Elec to CAL | 01/22/04 | -101 | 06/15/04 |
| 1M74000050 | EGSE System 5: Elec to TKR | 01/22/04 | -94 | 06/04/04 |
| 1M7941180 | EGSE Development Hrdw/FSW 1st Delivr-Elec to I&T | 01/22/04 | -104 | 06/18/04 |
| 1M1001260 | EM2 TEM/PS/CTS for FMB from Elec to CAL | 01/29/04 | -104 | 06/25/04 |
| 1M74000060 | EGSE System 6: Elec to TKR | 01/29/04 | -104 | 06/25/04 |
| 1M7941190 | EGSE TEM/TEM PS/CTS #1 for Bldg 33-Elec to I&T | 01/29/04 | -104 | 06/25/04 |
| 1M1001600 | EM2 TEM/PS/CTS for FM1 from Elec to CAL | 02/05/04 | -104 | 07/02/04 |
| 1M7941420 | EGSE TEM/TEM PS/CTS #2 for Bldg 33-Elec to I&T | 02/05/04 | -104 | 07/02/04 |

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**GLAST LAT PROJECT**
**Project Milestones (Level 3)**
**1 Year View (+/- 6mo)**

0525
LTX1 - MS (L3)
FLX1- MS (L3)

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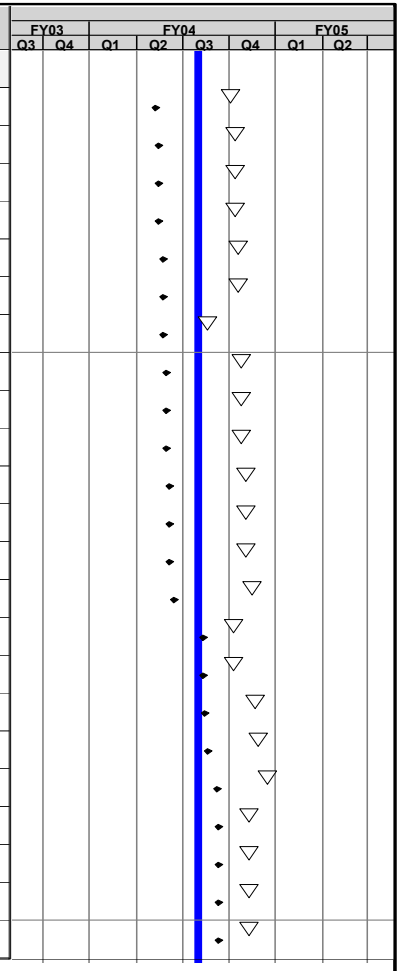
# Attachment 2
# Level 3 Milestones (One-Year View)
# Page 2 of 6

| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **Instrument Project Office (Level 3** | | | | |
| 1M7941430 | EGSE TEM/TEM PS/CTS w/ GASU for B33-Elec to | 02/05/04 | -104 | 07/02/04 |
| 1M1001650 | EM2 TEM/PS/CTS for FM2 from Elec to CAL | 02/12/04 | -104 | 07/12/04 |
| 1M74000070 | EGSE System 7: Elec to TKR | 02/12/04 | -104 | 07/12/04 |
| 1M74000080 | EGSE System 8: Elec to TKR | 02/12/04 | -104 | 07/12/04 |
| 1M74000090 | EGSE System 9: Elec to TKR | 02/20/04 | -104 | 07/19/04 |
| 1M74000100 | EGSE System 10: Elec to TKR | 02/20/04 | -104 | 07/19/04 |
| 1M76000030 | G3 Test Stand (Flt-like I/F): Elec to ACD | 02/20/04 | -64 | 05/20/04 |
| 1M1001660 | EM2 TEM/PS/CTS for FM3 from Elec to CAL | 02/27/04 | -104 | 07/26/04 |
| 1M1001680 | EM2 TEM/PS/CTS for FM4 from Elec to CAL | 02/27/04 | -104 | 07/26/04 |
| 1M1001720 | EM2 TEM/PS/CTS for FM5 from Elec to CAL | 02/27/04 | -104 | 07/26/04 |
| 1M1001760 | EM2 TEM/PS/CTS for FM6 from Elec to CAL | 03/05/04 | -104 | 08/02/04 |
| 1M1001770 | EM2 TEM/PS/CTS for FM7 from Elec to CAL | 03/05/04 | -104 | 08/02/04 |
| 1M1001780 | EM2 TEM/PS/CTS for FM8 from Elec to CAL | 03/05/04 | -104 | 08/02/04 |
| 1M005480 | ISOC CDR | 03/12/04 | -109 | 08/16/04 |
| 1M79003010 | Flight Cables Assy A: Elec to I&T | 05/10/04 | -42 | 07/09/04 |
| 1M79003020 | Flight Cables Assy B: Elec to I&T | 05/10/04 | -42 | 07/09/04 |
| 1M79002010 | Flight TEM PS Assy A: Elec to I&T | 05/12/04 | -70 | 08/20/04 |
| 1M79002020 | Flight TEM PS Assy B: Elec to I&T | 05/19/04 | -70 | 08/27/04 |
| 1M79001010 | Flight TEM Assy A: Elec to I&T | 06/07/04 | -70 | 09/15/04 |
| 1M79003030 | Flight Cables Assy 1: Elec to I&T | 06/10/04 | -42 | 08/10/04 |
| 1M79003040 | Flight Cables Assy 2: Elec to I&T | 06/10/04 | -42 | 08/10/04 |
| 1M79003050 | Flight Cables Assy 3: Elec to I&T | 06/10/04 | -42 | 08/10/04 |
| 1M79003060 | Flight Cables Assy 4: Elec to I&T | 06/10/04 | -42 | 08/10/04 |

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**GLAST LAT PROJECT**
**Project Milestones (Level 3)**
**1 Year View (+/- 6mo)**

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FLX1- MS (L3)

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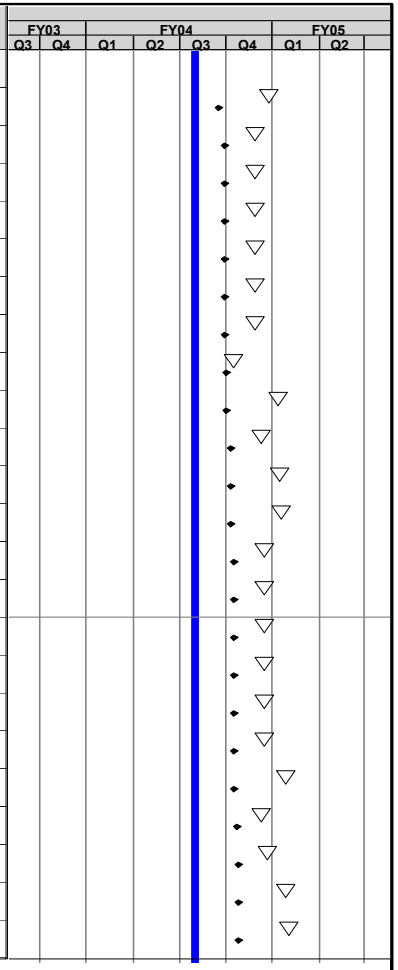
# Attachment 2
# Level 3 Milestones (One-Year View)
# Page 3 of 6

| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **Instrument Project Office (Level 3** | | | | |
| 1M79001020 | Flight TEM Assy B: Elec to I&T | 06/14/04 | -70 | 09/22/04 |
| 1M79003070 | Flight Cables Assy 5: Elec to I&T | 06/28/04 | -43 | 08/27/04 |
| 1M79003080 | Flight Cables Assy 6: Elec to I&T | 06/28/04 | -43 | 08/27/04 |
| 1M79003090 | Flight Cables Assy 7: Elec to I&T | 06/28/04 | -43 | 08/27/04 |
| 1M79003100 | Flight Cables Assy 8: Elec to I&T | 06/28/04 | -43 | 08/27/04 |
| 1M79003110 | Flight Cables Assy 9: Elec to I&T | 06/28/04 | -43 | 08/27/04 |
| 1M79003120 | Flight Cables Assy 10: Elec to I&T | 06/28/04 | -43 | 08/27/04 |
| 1M1001000 | ACD Test Scripts (from ACD to I&T) | 07/01/04 | -10 | 07/16/04 |
| 1M79002030 | Flight TEM PS Assy 1: Elec to I&T | 07/01/04 | -70 | 10/11/04 |
| 1M1000210 | Calorimeter Modules A RFI | 07/09/04 | -41 | 09/07/04 |
| 1M1500 | Calorimeter Modules B RFI | 07/09/04 | -67 | 10/13/04 |
| 1M79002040 | Flight TEM PS Assy 2: Elec to I&T | 07/09/04 | -70 | 10/18/04 |
| 1M79003130 | Flight Cables Assy 11: Elec to I&T | 07/15/04 | -43 | 09/15/04 |
| 1M79003140 | Flight Cables Assy 12: Elec to I&T | 07/15/04 | -43 | 09/15/04 |
| 1M79003150 | Flight Cables Assy 13: Elec to I&T | 07/15/04 | -43 | 09/15/04 |
| 1M79003160 | Flight Cables Assy 14: Elec to I&T | 07/15/04 | -43 | 09/15/04 |
| 1M79003170 | Flight Cables Assy 15: Elec to I&T | 07/15/04 | -43 | 09/15/04 |
| 1M79003180 | Flight Cables Assy 16: Elec to I&T | 07/15/04 | -43 | 09/15/04 |
| 1M79002050 | Flight TEM PS Assy 3: Elec to I&T | 07/16/04 | -70 | 10/25/04 |
| 1M1000240 | Flight Grid RFI-Mech to I&T | 07/22/04 | -34 | 09/09/04 |
| 1M1001790 | EM2 TEM/PS for FM9 (return FMA) from I&T to CAL | 07/23/04 | -41 | 09/21/04 |
| 1M1001800 | EM2 TEM/PS for FM10 (return FMB)from I&T to CAL | 07/23/04 | -67 | 10/27/04 |
| 1M79002060 | Flight TEM PS Assy 4: Elec to I&T | 07/23/04 | -70 | 11/01/04 |

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**GLAST LAT PROJECT**
**Project Milestones (Level 3)**
**1 Year View (+/- 6mo)**

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FLX1- MS (L3)

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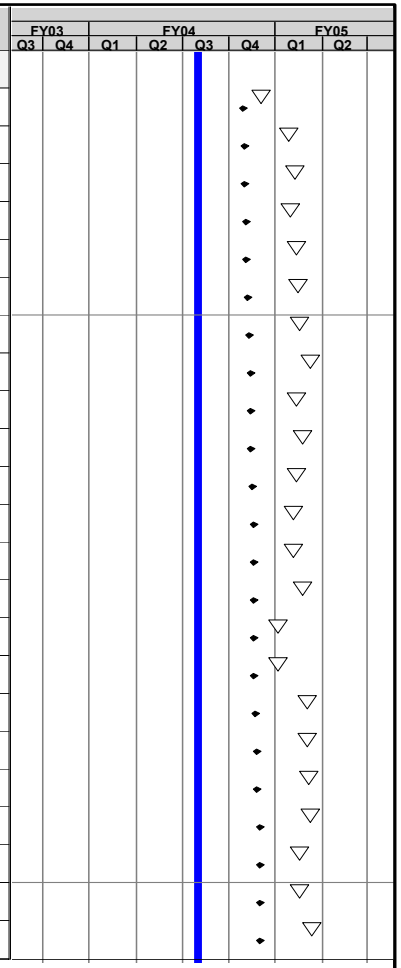
| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **Instrument Project Office (Level 3** | | | | |
| 1M1000200 | Tracker Modules A RFI | 07/28/04 | -27 | 09/03/04 |
| 1M1000230 | Calorimeter Modules 1 RFI | 07/30/04 | -62 | 10/27/04 |
| 1M79002070 | Flight TEM PS Assy 5: Elec to I&T | 07/30/04 | -70 | 11/08/04 |
| 1M1510 | Calorimeter Modules 2 RFI | 08/02/04 | -62 | 10/28/04 |
| 1M79001030 | Flight TEM Assy 1: Elec to I&T | 08/03/04 | -70 | 11/10/04 |
| 1M79002080 | Flight TEM PS Assy 6: Elec to I&T | 08/06/04 | -70 | 11/15/04 |
| 1M79001040 | Flight TEM Assy 2: Elec to I&T | 08/10/04 | -70 | 11/17/04 |
| 1M941710 | X-LAT Thermal Plate RFI from Mech to I&T | 08/12/04 | -82 | 12/09/04 |
| 1M1001810 | EM2 TEM/PS for FM11 (return FM1) from I&T to CAL | 08/13/04 | -62 | 11/10/04 |
| 1M79002090 | Flight TEM PS Assy 7: Elec to I&T | 08/13/04 | -70 | 11/22/04 |
| 1M1001820 | EM2 TEM/PS for FM12 (return FM2) from I&T to CAL | 08/16/04 | -62 | 11/11/04 |
| 1M1000400 | Flight Calorimeter Tower 3 RFI | 08/17/04 | -56 | 11/04/04 |
| 1M1520 | Flight Calorimeter Tower 4 RFI | 08/17/04 | -56 | 11/04/04 |
| 1M79001050 | Flight TEM Assy 3: Elec to I&T | 08/17/04 | -70 | 11/24/04 |
| 1M1000201 | Tracker Modules B RFI | 08/18/04 | -32 | 10/04/04 |
| 1M1000220 | Tracker Modules 1 RFI | 08/18/04 | -32 | 10/04/04 |
| 1M79002100 | Flight TEM PS Assy 8: Elec to I&T | 08/20/04 | -70 | 12/01/04 |
| 1M79001060 | Flight TEM Assy 4: Elec to I&T | 08/24/04 | -70 | 12/03/04 |
| 1M79002110 | Flight TEM PS Assy 9: Elec to I&T | 08/25/04 | -70 | 12/06/04 |
| 1M79002120 | Flight TEM PS Assy 10: Elec to I&T | 08/30/04 | -70 | 12/09/04 |
| 1M1001830 | EM2 TEM/PS for FM13 (return FM3) from I&T to CAL | 08/31/04 | -56 | 11/18/04 |
| 1M1001840 | EM2 TEM/PS for FM14 (return FM4) from I&T to CAL | 08/31/04 | -56 | 11/18/04 |
| 1M79001070 | Flight TEM Assy 5: Elec to I&T | 08/31/04 | -70 | 12/10/04 |




Run Date 06/04/04 18:21

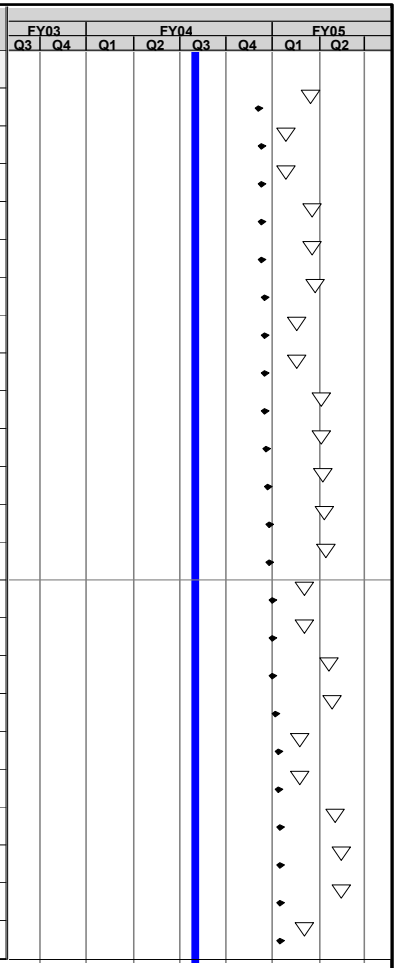


**GLAST LAT PROJECT**
**Project Milestones (Level 3)**
**1 Year View (+/- 6mo)**

0525
LTX1 - MS (L3)
FLX1- MS (L3)

Sheet 4 of 6

| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **Instrument Project Office (Level 3** | | | | |
| 1M79002130 | Flight TEM PS Assy 11: Elec to I&T | 09/02/04 | -70 | 12/14/04 |
| 1M1000221 | Tracker Modules 2 RFI | 09/08/04 | -33 | 10/25/04 |
| 1M1000250 | Flight Tracker Tower 3 RFI | 09/08/04 | -33 | 10/25/04 |
| 1M79001080 | Flight TEM Assy 6: Elec to I&T | 09/08/04 | -70 | 12/17/04 |
| 1M79002140 | Flight TEM PS Assy 12: Elec to I&T | 09/08/04 | -70 | 12/17/04 |
| 1M79002150 | Flight TEM PS Assy 13: Elec to I&T | 09/13/04 | -70 | 12/22/04 |
| 1M1000390 | Flight Calorimeter Tower 5 RFI | 09/15/04 | -44 | 11/16/04 |
| 1M1530 | Flight Calorimeter Tower 6 RFI | 09/15/04 | -44 | 11/16/04 |
| 1M79001090 | Flight TEM Assy 7: Elec to I&T | 09/15/04 | -70 | 01/03/05 |
| 1M79002160 | Flight TEM PS Assy 14: Elec to I&T | 09/16/04 | -70 | 01/04/05 |
| 1M79002170 | Flight TEM PS Assy 15: Elec to I&T | 09/21/04 | -70 | 01/07/05 |
| 1M79001100 | Flight TEM Assy 8: Elec to I&T | 09/22/04 | -70 | 01/10/05 |
| 1M79002180 | Flight TEM PS Assy 16: Elec to I&T | 09/24/04 | -70 | 01/12/05 |
| 1M1001850 | EM2 TEM/PS for FM15 (return FM5) from I&T to CAL | 09/29/04 | -44 | 12/02/04 |
| 1M1001860 | EM2 TEM/PS for FM16 (return FM6) from I&T to CAL | 09/29/04 | -44 | 12/02/04 |
| 1M79001110 | Flight TEM Assy 9: Elec to I&T | 09/29/04 | -70 | 01/18/05 |
| 1M79001120 | Flight TEM Assy 10: Elec to I&T | 10/06/04 | -70 | 01/25/05 |
| 1M1000380 | Flight Calorimeter Tower 7 RFI | 10/11/04 | -32 | 11/24/04 |
| 1M1540 | Flight Calorimeter Tower 8 RFI | 10/11/04 | -32 | 11/24/04 |
| 1M79001130 | Flight TEM Assy 11: Elec to I&T | 10/13/04 | -70 | 02/01/05 |
| 1M7941080 | Flight SIU-Elec to I&T | 10/13/04 | -79 | 02/14/05 |
| 1M7942000 | Flight PDU Box-Elec to I&T | 10/13/04 | -79 | 02/14/05 |
| 1M1000251 | Flight Tracker Tower 4 RFI | 10/14/04 | -32 | 12/01/04 |




Run Date 06/04/04 18:21



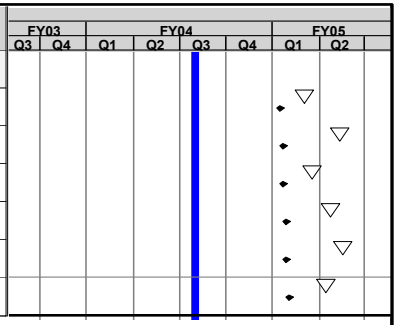
**GLAST LAT PROJECT**
**Project Milestones (Level 3)**
**1 Year View (+/- 6mo)**

0525
LTX1 - MS (L3)
FLX1- MS (L3)

Sheet 5 of 6

# Attachment 2
# Level 3 Milestones (One-Year View)
# Page 6 of 6

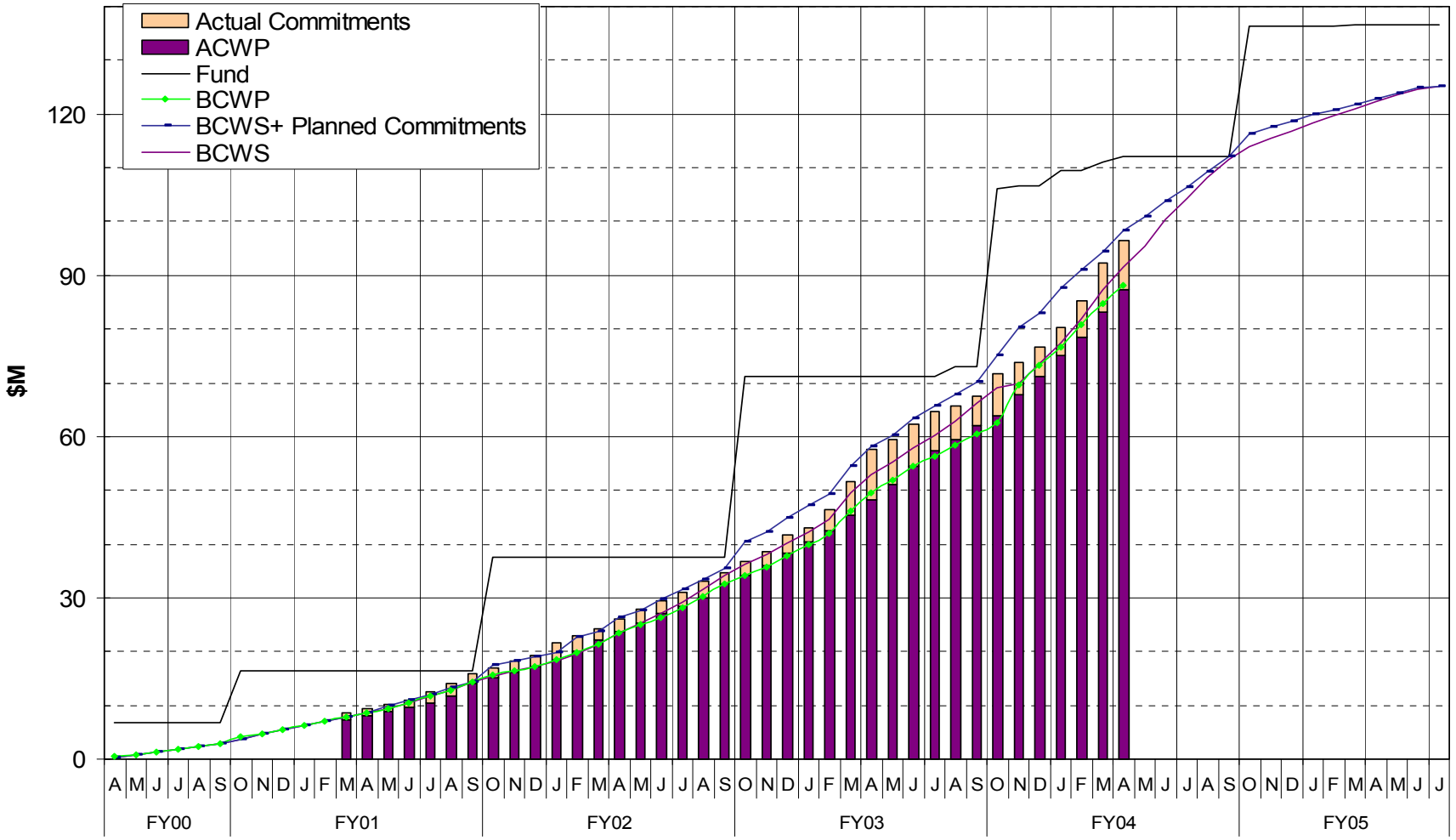
| Activity ID | Activity Description | Target Finish Date | Variance | Scheduled Finish Date |
|---|---|---|---|---|
| **Instrument Project Office (Level 3** | | | | |
| 1M1000260 | Flight Tracker Tower 5 RFI | 10/14/04 | -32 | 12/01/04 |
| 1M79001140 | Flight TEM Assy 12: Elec to I&T | 10/20/04 | -70 | 02/08/05 |
| 1M7941110 | Flight Harness-Elec to I&T | 10/20/04 | -40 | 12/17/04 |
| 1M7941070 | Flight GASU Box-Elec to I&T | 10/25/04* | -55 | 01/21/05 |
| 1M79001150 | Flight TEM Assy 13: Elec to I&T | 10/27/04 | -70 | 02/15/05 |
| 1M7941090 | Flight Event Processor Units-Elec to I&T | 11/01/04 | -45 | 01/13/05 |




| | | |
|---|---|---|
| Run Date 06/04/04 18:21<br>© Primavera Systems, Inc. | **GLAST LAT PROJECT**<br>**Project Milestones (Level 3)**<br>**1 Year View (+/- 6mo)** | 0525 Sheet 6 of 6<br>LTX1 - MS (L3)<br>FLX1- MS (L3) |

**Attachment 3**

## Budget vs Actuals vs Performance
## DOE + NASA Project Expenditures
## 4.1 LAT



# Attachment 4
# LAT Costs, through April 2004, by WBS

| Monthly Contractor Financial Management Report | | | | | | | | Report for Month Ending: 4/30/2004 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| To: Kevin Grady, GLAST Project Manager (NASA)<br>Ev Valle, LAT Project Manager (DOE) | | | From: Tanya Boysen, LAT Project Controls Manager | | | | | Budget Value<br>Cost: 0 | Fee: 0 | |
| LAT3<br><br>GLAST LAT Project | Type: | | | | | | | Fund Limitation:<br><br>0 | | |
| Reporting Category | Cost Incurred | | | | Estimated Cost | | | 4/3/2000 Estimated Final Cost | Billing | Unfilled Orders Outstanding |
| | During Month | | Cum. to Date | | Detail | | Balance of | Project | Budget | |
| | Actual | Planned | Actual | Planned | MAY04 | JUN04 | Budget | Estimate | Value | |
| 4.1.1 INSTRUMENT MANAGEMENT | 417 | 353 | 11,874 | 11,715 | 308 | 356 | 3,330 | 15,868 | 15,868 | |
| 4.1.2 SYSTEM ENGINEERING | 118 | 151 | 4,672 | 4,853 | 140 | 151 | 1,638 | 6,601 | 6,601 | |
| 4.1.4 TRACKER | 474 | 643 | 11,852 | 12,669 | 451 | 350 | 2,393 | 15,046 | 15,046 | |
| 4.1.5 CALORIMETER | 600 | 727 | 14,796 | 16,157 | 749 | 960 | 5,598 | 22,103 | 22,103 | |
| 4.1.6 ANTICOINCIDENCE DETECTOR | 616 | 237 | 11,960 | 12,610 | 153 | 117 | 1,688 | 13,918 | 13,918 | |
| 4.1.7 ELECTRONICS | 925 | 950 | 13,719 | 14,118 | 918 | 1,688 | 4,118 | 20,443 | 20,443 | |
| 4.1.8 MECHANICAL SYSTEMS | 293 | 500 | 8,470 | 8,626 | 632 | 824 | 4,180 | 14,106 | 14,106 | |
| 4.1.9 INTEGRATION & TEST | 321 | 377 | 3,643 | 3,795 | 262 | 253 | 3,216 | 7,373 | 7,373 | |
| 4.1.A PERFORMANCE AND SAFETY ASSURANCE | 195 | 123 | 1,429 | 1,731 | 112 | 123 | 805 | 2,469 | 2,469 | |
| 4.1.B LAT INSTRUMENT OPERATIONS CENTER | 0 | 4 | 295 | 279 | 3 | 4 | 25 | 328 | 328 | |
| 4.1.C EDUCATION AND PUBLIC OUTREACH | 79 | 101 | 1,365 | 1,626 | 67 | 74 | 942 | 2,448 | 2,448 | |
| 4.1.D SCIENCE ANALYSIS SOFTWARE | 43 | 76 | 1,863 | 2,013 | 65 | 83 | 1,105 | 3,117 | 3,117 | |
| 4.1.E SUBORBITAL FLIGHT TEST | 0 | 0 | 1,325 | 1,325 | 0 | 0 | 0 | 1,325 | 1,325 | |
| Gen. and Admin. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total | 4,081 | 4,241 | 87,264 | 91,518 | 3,860 | 4,983 | 29,037 | 125,145 | 125,145 | |

# Attachment 5
# LAT Costs, through April 2004, by Organization and Cost Code

| Monthly Contractor Financial Management Report | | | Report for Month Ending: 4/30/2004 |
|---|---|---|---|
| To:<br>Kevin Grady, GLAST Project Manager (NASA)<br>Ev Valle, LAT Project Manager (DOE) | From:<br>Tanya Boysen, LAT Project Controls Manager | | Budget Value<br>Cost: 0 Fee: 0 |
| LAT3<br><br>GLAST LAT Project | Type: | | Fund Limitation:<br><br>0 |

| Reporting Category | Cost Incurred | | | | Estimated Cost | | | 4/3/2000 Estimated Final Cost | Billing | Unfilled Orders Outstanding |
|---|---|---|---|---|---|---|---|---|---|---|
| | During Month | | Cum. to Date | | Detail | | Balance of Budget | Project Estimate | Budget Value | |
| | Actual | Planned | Actual | Planned | MAY04 | JUN04 | | | | |
| DG *** GSFC | 621 | 275 | 13,106 | 14,111 | 188 | 155 | 2,495 | 15,944 | 15,944 | |
| DH *** HEPL | 198 | 191 | 4,900 | 5,263 | 177 | 204 | 1,887 | 7,168 | 7,168 | |
| DL *** SLAC | 2,419 | 2,781 | 47,778 | 48,817 | 2,528 | 3,432 | 16,253 | 69,991 | 69,991 | |
| DN *** NRL | 714 | 849 | 17,845 | 19,326 | 861 | 1,073 | 6,807 | 26,585 | 26,585 | |
| DO *** Financial Plan Transfer/Sub Out | 0 | 0 | 59 | 54 | 0 | 0 | -5 | 54 | 54 | |
| DS *** SSU | 79 | 98 | 1,360 | 1,601 | 65 | 71 | 904 | 2,401 | 2,401 | |
| DT *** Texas A&M | 0 | 0 | 15 | 16 | 0 | 0 | 0 | 16 | 16 | |
| DU *** UCSC | 43 | 38 | 2,082 | 2,195 | 34 | 38 | 572 | 2,726 | 2,726 | |
| DW *** UW | 6 | 9 | 120 | 134 | 8 | 9 | 123 | 260 | 260 | |
| Total | 4,081 | 4,241 | 87,264 | 91,518 | 3,861 | 4,982 | 29,038 | 125,145 | 125,145 | |

| Reporting Category | Cost Incurred/Hours Worked | | | | Estimated Cost/Hours to Complete | | | Estimated Final Cost/Hours | | Unfilled Orders Outstanding |
|---|---|---|---|---|---|---|---|---|---|---|
| | During Month | | Cum. to Date | | Detail | | Balance of Budget | Project Estimate | Budget Value | |
| | Actual | Planned | Actual | Planned | MAY04 | JUN04 | | | | |
| RL LABOR | 1,800 | 1,943 | 44,875 | 45,197 | 1,777 | 1,934 | 14,932 | 63,518 | 63,518 | |
| *FTE (DOE/NASA)* | *176.0* | *137.8* | *4,115.5* | *3,859.7* | *155.0* | *148.0* | *919.4* | *5,338.0* | *5,338.0* | |
| *HOURS (DOE/NASA)* | *30,965* | *24,255* | *684,530* | *638,957* | *24,803* | *26,118* | *148,964.6* | *884,416* | *884,416* | |
| RT TRAVEL | 31 | 57 | 1,130 | 1,814 | 50 | 62 | 1,467 | 2,709 | 2,709 | |
| RM MATERIAL & SERVICES | 2,249 | 2,237 | 38,952 | 42,009 | 2,031 | 2,982 | 12,323 | 56,288 | 56,288 | |
| RX MPS & LAB TAX | 0 | 4 | 2,307 | 2,498 | 3 | 4 | 315 | 2,629 | 2,629 | |
| Total (not incl FTE/Hours) | 4,081 | 4,241 | 87,264 | 91,518 | 3,861 | 4,982 | 29,038 | 125,145 | 125,145 | |

# Attachment 6
# LAT Performance, through April 2004, by WBS

| Cost Performance Report - Work Breakdown Structure | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor:<br>Location: | | | | | Contract Type/No: | | | Project Name/No:<br>GLAST LAT Project | | Report Period:<br>3/31/2004 | 4/30/2004 | | |
| Quantity<br>1 | Negotiated Cost<br>0 | | Est. Cost Authorized Unpriced Work<br>0 | | Tgt. Profit/ Fee %<br>0 | 0 | Tgt. Price<br>0 | Est Price<br>0 | Share Ratio | Contract Ceiling<br>0 | Estimated Contract Ceiling<br>0 | | |
| CAPW[3] | Current Period | | | | | Cumulative to Date | | | | | At Completion | | |
| | Budgeted Cost | | Actual Cost | Variance | | Budgeted Cost | | Actual Cost | Variance | | | Latest | |
| Item | Work Scheduled | Work Performed | Work Performed | Schedule | Cost | Work Scheduled | Work Performed | Work Performed | Schedule | Cost | Budgeted | Revised Estimate | Variance |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| 4.1.1 INSTRUMENT MANAGEMENT | 353 | 353 | 417 | 0 | -64 | 11,715 | 11,715 | 11,874 | 0 | -159 | 15,868 | 15,868 | 0 |
| 4.1.2 SYSTEM ENGINEERING | 151 | 181 | 118 | 30 | 63 | 4,853 | 4,853 | 4,672 | 0 | 181 | 6,601 | 6,601 | 0 |
| 4.1.4 TRACKER | 643 | 471 | 474 | -172 | -3 | 12,669 | 11,958 | 11,852 | -712 | 106 | 15,046 | 15,046 | 0 |
| 4.1.5 CALORIMETER | 727 | 443 | 600 | -284 | -157 | 16,157 | 15,390 | 14,796 | -767 | 594 | 22,103 | 22,103 | 0 |
| 4.1.6 ANTICOINCIDENCE DETECTOR | 237 | 293 | 616 | 56 | -323 | 12,610 | 11,991 | 11,960 | -619 | 31 | 13,918 | 13,918 | 0 |
| 4.1.7 ELECTRONICS | 950 | 547 | 925 | -403 | -378 | 14,118 | 13,153 | 13,719 | -965 | -566 | 20,443 | 20,443 | 0 |
| 4.1.8 MECHANICAL SYSTEMS | 500 | 694 | 293 | 195 | 401 | 8,626 | 8,596 | 8,470 | -30 | 126 | 14,106 | 14,106 | 0 |
| 4.1.9 INTEGRATION & TEST | 377 | 286 | 321 | -90 | -35 | 3,795 | 3,634 | 3,643 | -161 | -9 | 7,373 | 7,373 | 0 |
| 4.1.A PERFORMANCE AND SAFETY AS | 123 | 123 | 195 | 0 | -72 | 1,731 | 1,731 | 1,429 | 0 | 301 | 2,469 | 2,469 | 0 |
| 4.1.B LAT INSTRUMENT OPERATIONS ( | 4 | 4 | 0 | 0 | 4 | 279 | 279 | 295 | 0 | -17 | 328 | 328 | 0 |
| 4.1.C EDUCATION AND PUBLIC OUTRE | 101 | 86 | 79 | -15 | 7 | 1,626 | 1,607 | 1,365 | -20 | 242 | 2,448 | 2,448 | 0 |
| 4.1.D SCIENCE ANALYSIS SOFTWARE | 76 | 76 | 43 | 0 | 33 | 2,013 | 2,013 | 1,863 | 0 | 150 | 3,117 | 3,117 | 0 |
| 4.1.E SUBORBITAL FLIGHT TEST | 0 | 0 | 0 | 0 | 0 | 1,325 | 1,325 | 1,325 | 0 | 0 | 1,325 | 1,325 | 0 |
| Gen. and Admin. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Undist. Budget | | | | | | | | | | | 0 | 0 | 0 |
| Sub Total | 4,241 | 3,557 | 4,081 | -684 | -524 | 91,518 | 88,243 | 87,264 | -3,274 | 979 | 125,145 | 125,145 | 0 |
| Contingency | | | | | | | | | | | 11,444 | 11,444 | 0 |
| Total | 4,241 | 3,557 | 4,081 | -684 | -524 | 91,518 | 88,243 | 87,264 | -3,274 | 979 | 136,589 | 136,589 | 0 |

## Attachment 7
## LAT Performance, through April 2004, by Organization

| Cost Performance Report - Work Breakdown Structure | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor:<br>Location: | | | | | Contract Type/No: | | | Project Name/No:<br>GLAST LAT Project | | Report Period:<br>3/31/2004 | 4/30/2004 | | |
| Quantity | Negotiated Cost | | Est. Cost Authorized Unpriced Work | | Tgt. Profit/ Fee % | Tgt. Price | Est Price | Share Ratio | Contract Ceiling | Estimated Contract Ceiling | | | |
| 1 | 0 | | 0 | | 0 0 | 0 | 0 | | 0 | 0 | | | |
| OBS[1] | Current Period | | | | | Cumulative to Date | | | | | At Completion | | |
| | Budgeted Cost | | Actual Cost | Variance | | Budgeted Cost | | Actual Cost | Variance | | | | |
| Item | Work Scheduled | Work Performed | Work Performed | Schedule | Cost | Work Scheduled | Work Performed | Work Performed | Schedule | Cost | Budgeted | Latest Revised Estimate | Variance |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| DG *** GSFC | 275 | 331 | 621 | 56 | -290 | 14,111 | 13,472 | 13,106 | -639 | 366 | 15,944 | 15,944 | 0 |
| DH *** HEPL | 191 | 191 | 198 | 0 | -7 | 5,263 | 5,257 | 4,900 | -6 | 357 | 7,168 | 7,168 | 0 |
| DL *** SLAC | 2,781 | 2,349 | 2,419 | -432 | -70 | 48,817 | 46,990 | 47,778 | -1,827 | -788 | 69,991 | 69,991 | 0 |
| DN *** NRL | 849 | 556 | 714 | -293 | -159 | 19,326 | 18,563 | 17,845 | -763 | 718 | 26,585 | 26,585 | 0 |
| DO *** Financial Plan | 0 | 0 | 0 | 0 | 0 | 54 | 54 | 59 | 0 | -5 | 54 | 54 | 0 |
| DS *** SSU | 98 | 83 | 79 | -15 | 3 | 1,601 | 1,582 | 1,360 | -20 | 221 | 2,401 | 2,401 | 0 |
| DT *** Texas A&M | 0 | 0 | 0 | 0 | 0 | 16 | 16 | 15 | 0 | 0 | 16 | 16 | 0 |
| DU *** UCSC | 38 | 38 | 43 | 0 | -6 | 2,195 | 2,176 | 2,082 | -19 | 95 | 2,726 | 2,726 | 0 |
| DW *** UW | 9 | 9 | 6 | 0 | 3 | 134 | 134 | 120 | 0 | 14 | 260 | 260 | 0 |
| Gen. and Admin. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Undist. Budget | | | | | | | | | | | 0 | 0 | 0 |
| Sub Total | 4,241 | 3,557 | 4,081 | -684 | -524 | 91,518 | 88,243 | 87,264 | -3,274 | 979 | 125,145 | 125,145 | 0 |
| Contingency | | | | | | | | | | | 11,444 | 11,444 | 0 |
| Total | 4,241 | 3,557 | 4,081 | -684 | -524 | 91,518 | 88,243 | 87,264 | -3,274 | 979 | 136,589 | 136,589 | 0 |

**Attachment 8**
**LAT Performance Analysis, April 2004**

| | WBS | BAC | BCWS | BCWP | ACWP | SV $ | CV $ | % BCWS | % BCWP | % ACWP | SPI Trend | CPI Trend | SPI | CPI | Cpi_Fcst | CpiSpi_Fcst |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.1 | 125,145 | 91,518 | 88,244 | 87,264 | -3,274 | 979 | 73.13 | 70.51 | 69.73 | ↓ | ↓ | 0.964 | 1.011 | 123,756 | 125,110 |
| 2 | 4.1.1 | 15,868 | 11,715 | 11,715 | 11,874 | 0 | -159 | 73.83 | 73.83 | 74.83 | ↔ | ↓ | 1.000 | 0.987 | 16,084 | 16,084 |
| 3 | 4.1.2 | 6,601 | 4,853 | 4,853 | 4,672 | 0 | 181 | 73.52 | 73.52 | 70.78 | ↑ | ↑ | 1.000 | 1.039 | 6,355 | 6,355 |
| 4 | 4.1.4 | 15,046 | 12,669 | 11,958 | 11,852 | -712 | 106 | 84.21 | 79.48 | 78.77 | ↓ | ↔ | 0.944 | 1.009 | 14,913 | 15,095 |
| 5 | 4.1.5 | 22,103 | 16,157 | 15,390 | 14,796 | -767 | 594 | 73.10 | 69.63 | 66.94 | ↓ | ↓ | 0.953 | 1.040 | 21,250 | 21,572 |
| 6 | 4.1.6 | 13,918 | 12,610 | 11,991 | 11,960 | -619 | 31 | 90.60 | 86.15 | 85.93 | ↑ | ↓ | 0.951 | 1.003 | 13,882 | 13,981 |
| 7 | 4.1.7 | 20,443 | 14,118 | 13,153 | 13,719 | -965 | -566 | 69.06 | 64.34 | 67.11 | ↓ | ↓ | 0.932 | 0.959 | 21,323 | 21,881 |
| 8 | 4.1.8 | 14,106 | 8,626 | 8,596 | 8,470 | -30 | 126 | 61.15 | 60.94 | 60.05 | ↑ | ↑ | 0.996 | 1.015 | 13,900 | 13,919 |
| 9 | 4.1.9 | 7,373 | 3,795 | 3,634 | 3,643 | -161 | -9 | 51.47 | 49.29 | 49.40 | ↓ | ↓ | 0.958 | 0.998 | 7,391 | 7,557 |
| 10 | 4.1.A | 2,469 | 1,731 | 1,731 | 1,429 | 0 | 302 | 70.10 | 70.10 | 57.89 | ↔ | ↓ | 1.000 | 1.211 | 2,039 | 2,039 |
| 11 | 4.1.B | 328 | 279 | 279 | 295 | 0 | -17 | 85.09 | 85.09 | 90.14 | ↔ | ↑ | 1.000 | 0.944 | 347 | 347 |
| 12 | 4.1.C | 2,448 | 1,626 | 1,607 | 1,365 | -20 | 242 | 66.42 | 65.62 | 55.75 | ↓ | ↔ | 0.988 | 1.177 | 2,080 | 2,089 |
| 13 | 4.1.D | 3,117 | 2,013 | 2,013 | 1,863 | 0 | 150 | 64.58 | 64.58 | 59.78 | ↔ | ↑ | 1.000 | 1.080 | 2,885 | 2,885 |
| 14 | 4.1.E | 1,325 | 1,325 | 1,325 | 1,325 | 0 | 0 | 100.00 | 100.00 | 99.98 | ↔ | ↔ | 1.000 | 1.000 | 1,325 | 1,325 |

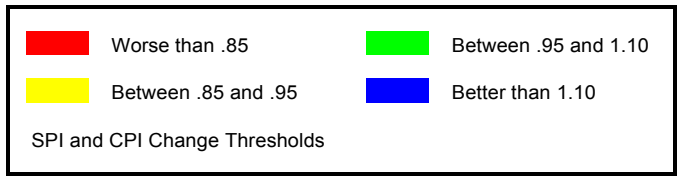
## LEGEND

BAC: Budget At Complete
BCWS: Budgeted Cost of Work Scheduled (to date)
BCWP: Budgeted Cost of Work Performed (to date)
ACWP: Actual Cost of Work Performed (to date)

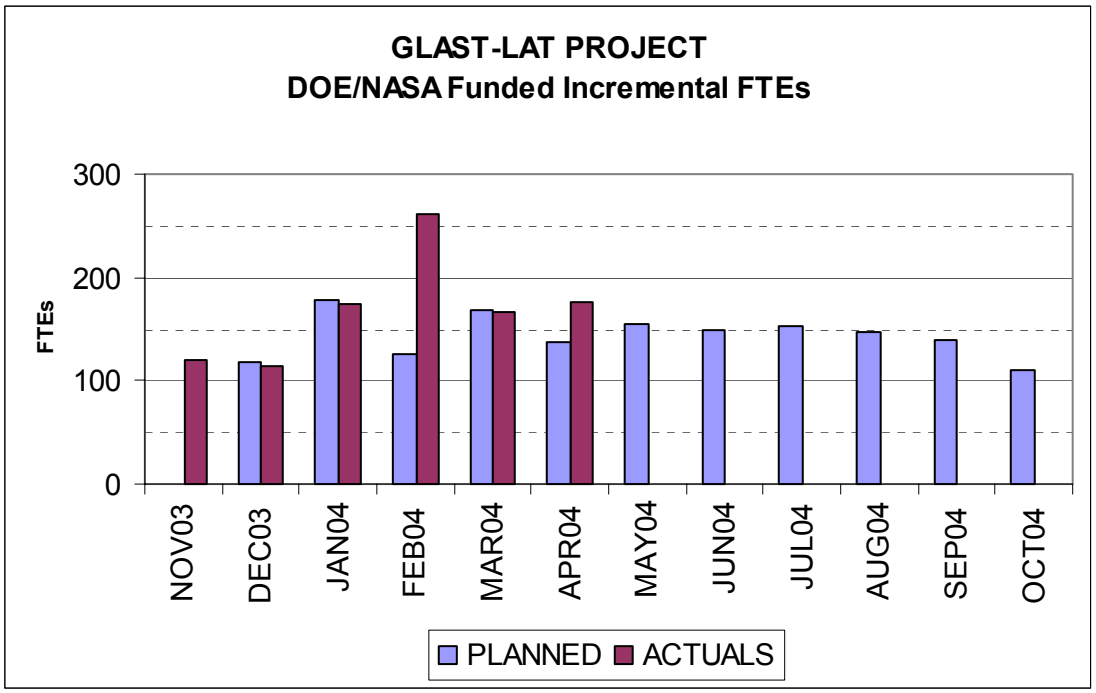
SV $: Schedule Variance = BCWP - BCWS
CV $: Cost Variance = BCWP - ACWP
SPI: Schedule Performance Index = BCWP/BCWS
CPI: Cost Performance Index = BCWP/ACWP

% BCWS: Percent Scheduled = BCWS/BAC
% BCWP: Percent Complete = BCWP/BAC
% ACWP: Percent Spent = ACWP/BAC

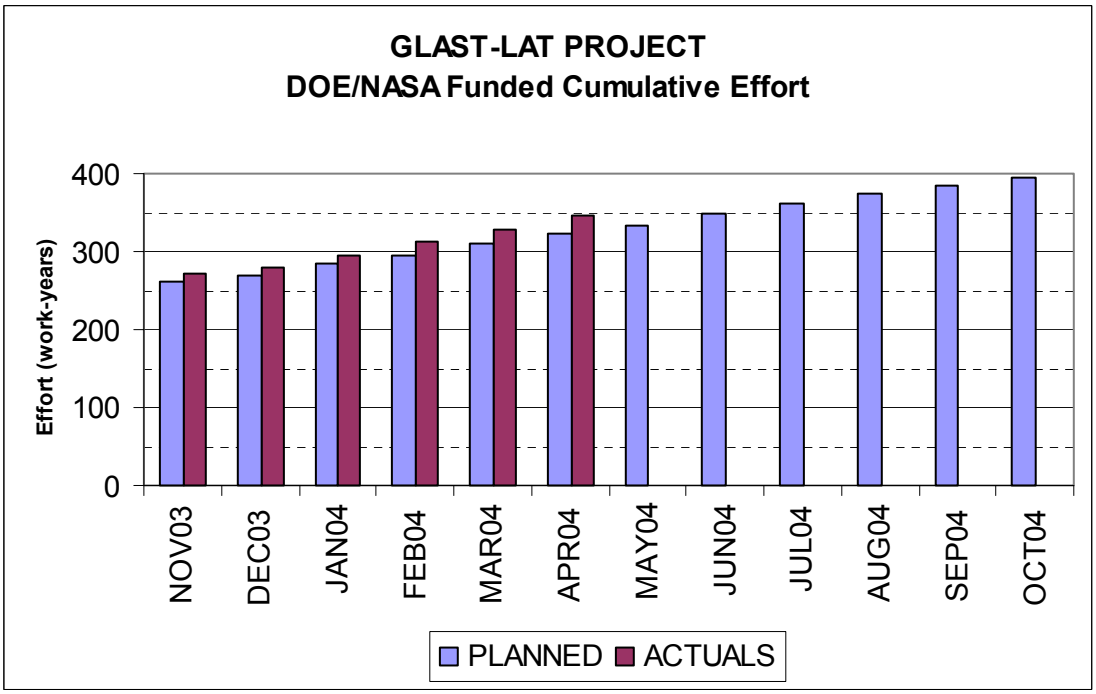
Cpi_Fcst: CPI (to date) EAC Forecast = BAC / CPI
CpiSpi_Fcst: Combination CPI and SPI EAC Forecast = ACWP + (BAC - BCWP) / (CPI *SPI)



**Attachment 9**
**LAT Manpower (DOE/NASA-Funded)**




*Note: Monthly planned manpower reflects adjustments so that the cumulative-to-date plan corresponds to the approved changes for that month.*



# Attachment 10
# LAT Manpower Data, through April 2004, by Organization

| Program: LAT3 | Description: GLAST LAT Project | Approval: Program Manager |
|---|---|---|
| Run Date: 6/7/2004 | Status Date: 4/30/2004 | Functional Manager |
| | | Cost Account Manager |

| OBS | | PRIOR | NOV03 | DEC03 | JAN04 | FEB04 | MAR04 | APR04 | **Cum-to-Date** | MAY04 | JUN04 | JUL04 | AUG04 | SEP04 | OCT04 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DG *** GSFC | | | | | | | | | | | | | | | |
| FTE | PLANNED | 704.7 | -8.1 | 21.2 | 27.8 | 29.9 | 61.0 | 58.3 | **894.7** | 28.6 | 21.4 | 23.6 | 25.8 | 27.8 | 13.3 |
| | ACTUALS | 694.9 | 0.0 | 0.0 | 65.6 | 153.4 | 48.7 | 45.4 | **1008.0** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DH *** HEPL | | | | | | | | | | | | | | | |
| FTE | PLANNED | 303.5 | -56.1 | 5.3 | 0.0 | 3.2 | 3.2 | 2.4 | **261.5** | 3.4 | 4.5 | 4.9 | 4.9 | 4.9 | 3.8 |
| | ACTUALS | 223.3 | 6.1 | 13.6 | 11.7 | -2.5 | 4.0 | 2.7 | **259.0** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DL *** SLAC | | | | | | | | | | | | | | | |
| FTE | PLANNED | 1586.5 | 23.1 | 64.2 | 117.4 | 77.1 | 79.7 | 78.1 | **2026.1** | 92.5 | 89.7 | 91.4 | 82.3 | 81.3 | 71.1 |
| | ACTUALS | 1476.7 | 66.4 | 63.0 | 69.1 | 77.5 | 84.7 | 91.0 | **1928.4** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DN *** NRL | | | | | | | | | | | | | | | |
| FTE | PLANNED | 718.5 | 37.9 | 36.5 | 37.6 | 22.2 | 36.9 | 17.1 | **906.7** | 49.4 | 51.0 | 44.3 | 41.9 | 32.5 | 29.7 |
| | ACTUALS | 728.4 | 35.4 | 38.3 | 30.1 | 34.8 | 35.0 | 35.4 | **937.4** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DS *** SSU | | | | | | | | | | | | | | | |
| FTE | PLANNED | 73.8 | 2.7 | 2.4 | 4.8 | 3.2 | 3.2 | 3.2 | **93.2** | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 2.0 |
| | ACTUALS | 86.2 | 4.0 | 3.5 | 5.1 | 3.3 | 3.0 | 6.0 | **111.0** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DU *** UCSC | | | | | | | | | | | | | | | |
| FTE | PLANNED | 212.1 | 10.0 | 4.6 | 6.3 | 6.9 | 4.7 | 4.4 | **249.0** | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| | ACTUALS | 255.7 | 19.4 | 5.8 | 4.7 | 5.2 | 3.3 | 6.7 | **300.8** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DW *** UW | | | | | | | | | | | | | | | |
| FTE | PLANNED | 37.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | **39.7** | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| | ACTUALS | 9.0 | 0.6 | 1.0 | 0.0 | 1.7 | 0.9 | 1.0 | **14.1** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FF *** France | | | | | | | | | | | | | | | |
| FTE | PLANNED | 1067.3 | -15.5 | 10.9 | 14.8 | 15.2 | 15.2 | 15.2 | **1122.9** | 15.2 | 15.2 | 15.2 | 15.2 | 15.2 | 14.2 |
| | ACTUALS | | | | | | | | **0.0** | | | | | | |
| FI *** Italy | | | | | | | | | | | | | | | |
| FTE | PLANNED | 432.2 | -69.7 | 9.1 | 9.1 | 9.1 | 9.4 | 15.6 | **414.8** | 15.2 | 14.9 | 12.8 | 14.6 | 15.2 | 9.1 |
| | ACTUALS | 310.6 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | **375.7** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FJ *** Japan | | | | | | | | | | | | | | | |
| FTE | PLANNED | 94.3 | 0.9 | 1.2 | 1.0 | 1.0 | 0.9 | 0.5 | **99.7** | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| | ACTUALS | 72.0 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | **82.5** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FK *** Sweden | | | | | | | | | | | | | | | |
| FTE | PLANNED | 104.6 | 5.1 | 3.8 | 3.5 | 3.6 | 3.6 | 3.6 | **127.7** | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 |
| | ACTUALS | | | | | | | | **0.0** | | | | | | |
| Grand Totals: | | | | | | | | | | | | | | | |
| | PLANNED | 5334.8 | -69.4 | 159.7 | 222.6 | 171.6 | 218.1 | 198.6 | **6236.0** | 216.2 | 208.6 | 204.1 | 196.7 | 188.9 | 152.0 |
| | ACTUALS | 3856.8 | 144.5 | 137.8 | 198.9 | 286.0 | 192.2 | 200.8 | **5016.9** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.1 GLAST LAT | | | | | | | | | | | | | | | |
| Contributed | PLANNED | 2192.0 | -59.5 | 42.4 | 45.1 | 45.9 | 49.8 | 60.8 | **2376.3** | 61.1 | 60.2 | 50.2 | 49.5 | 50.1 | 42.6 |
| | ACTUALS | 753.6 | 24.4 | 23.8 | 24.1 | 24.3 | 26.4 | 24.8 | **901.4** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Funded | PLANNED | 3142.8 | -9.9 | 117.4 | 177.5 | 125.7 | 168.3 | 137.8 | **3859.6** | 155.0 | 148.4 | 153.8 | 147.2 | 138.8 | 109.4 |
| | ACTUALS | 3103.3 | 120.1 | 114.0 | 174.8 | 261.7 | 165.8 | 176.0 | **4115.5** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Grand Totals: | PLANNED | 5334.8 | -69.4 | 159.7 | 222.6 | 171.6 | 218.1 | 198.6 | **6235.9** | 216.2 | 208.6 | 204.1 | 196.7 | 188.9 | 152.0 |
| | ACTUALS | 3856.8 | 144.4 | 137.8 | 198.9 | 286.0 | 192.2 | 200.8 | **5016.9** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |